Your search matched **1** of **1121826** documents.
A maximum of **500** results are displayed, **15** to a page, sorted by **Relevance Descending** order.

Refine This Search:
You may refine your search by editing the current search expression or enteri new one in the text box.

metal and nanoparticles and gan [Search]

☐ Check to search within this result set

Results Key:
JNL = Journal or Magazine **CNF** = Conference **STD** = Standard

---

1 **Field emission characterisation of silicon tip arrays coated with GaN diamond nanoparticle cluster**
Hajra, M.; Chubun, N.N.; Chakhovskoi, A.G.; Hunt, C.E.; Liu, K.; Murali, A.; Risbud, S.H.; Tyler, T.; Zhirnov, V.;
Vacuum Microelectronics Conference, 2001. IVMC 2001. Proceedings of the 14 International , 12-16 Aug. 2001
Pages:121 - 122

[Abstract] [PDF Full-Text (116 KB)] **IEEE CNF**

L5 ANSWER 2 OF 3 INSPEC (C) 2005 IEE on STN
AN 2003:7626164 INSPEC DN A2003-12-6170J-029; B2003-06-2520D-105
TI Evaluation of **nanopipes** in **GaN** films by localized avalanche breakdown.
AU Ohkubo, M. (Fukui Univ., Japan)
SO Compound Semiconductors 2001. Proceedings of the Twenty-Eighth International Symposium on Compound Semiconductors
Editor(s): Arakawa, Y.; Hirayama, Y.; Kishino, K.; Yamaguchi, H.
Bristol, UK: IOP Publishing, 2002. p.831-6 of xxxi+855 pp. 16 refs.
Conference: Tokyo, Japan, 1-4 Oct 2001
ISBN: 0-7503-0856-7
DT Conference Article
TC Experimental
CY United Kingdom
LA English
AB Defects in **GaN** layers grown by **metal** organic chemical vapor deposition (MOCVD) have been investigated by generating etch pits. Using scanning electron microscopy (SEM), etch pits are found to form on the surface of **GaN** layers by localized avalanche breakdown using NaOH electrolyte. It is found that these etch pits correspond to **nanopipes** in **GaN** layers. The **nanopipes** etching by localized avalanche breakdown is found to become a simple method to detect **nanopipes** in **GaN** layers.
CC A6170J Etch pits, decoration, transmission electron-microscopy and other direct observations of dislocations; A8115H Chemical vapour deposition; A6855 Thin film growth, structure, and epitaxy; A7220H High-field transport and nonlinear effects (semiconductors/insulators); A6146 Structure of solid clusters, nanoparticles, and nanostructured materials; A7360L Electrical properties of III-V and II-VI semiconductors (thin films/low-dimensional structures); A7750 Dielectric breakdown and space-charge effects; B2520D II-VI and III-V semiconductors; B0520F Chemical vapour deposition; B2550E Surface treatment (semiconductor technology); B2810D Dielectric breakdown and discharges
CT AVALANCHE BREAKDOWN; CRYSTAL DEFECTS; CURRENT DENSITY; DISLOCATION DENSITY; ETCHING; GALLIUM COMPOUNDS; III-V SEMICONDUCTORS; MOCVD; NANOSTRUCTURED MATERIALS; NANOTECHNOLOGY; SCANNING ELECTRON MICROSCOPY; SEMICONDUCTOR EPITAXIAL LAYERS; SEMICONDUCTOR GROWTH; VAPOUR PHASE EPITAXIAL GROWTH; WIDE BAND GAP SEMICONDUCTORS
ST **GaN films; nanopipes detection**; localized avalanche breakdown; **GaN layers growth; metal organic chemical vapor deposition**; MOCVD; etch pits; scanning electron microscopy; SEM; NaOH electrolyte; **anodic current density**; **GaN**; Al2O3; NaOH
CHI GaN bin, Ga bin, N bin; Al2O3 sur, Al2 sur, Al sur, O3 sur, O sur, Al2O3 bin, Al2 bin, Al bin, O3 bin, O bin; NaOH ss, Na ss, OH ss, H ss, O ss
ET Ga*N; GaN; Ga cp; cp; N cp; H*Na*O; NaOH; Na cp; O cp; H cp; V; Al*O; Al2O3; Al cp; Ga; Al2O; Al; O; Na; H*O; OH

L5 ANSWER 3 OF 3 INSPEC (C) 2005 IEE on STN
AN 2002:7165288 INSPEC DN B2002-03-2550N-003
TI Two-dimensional lateral superlattices of nanostructures: Nonlithographic formation by **anodic** membrane template.
AU Jianyu Liang; Chik, H.; Yin, A.; Jimmy Xu (Div. of Eng., Brown Univ., Providence, RI, USA)
SO Journal of Applied Physics (15 Feb. 2002) vol.91, no.4, p.2544-6. 10 refs.
Doc. No.: S0021-8979(02)06304-1
Published by: AIP
Price: CCCC 0021-8979/2002/91(4)/2544(3)/$19.00
CODEN: JAPIAU ISSN: 0021-8979
SICI: 0021-8979(20020215)91:4L.2544:DLSN;1-B
DT Journal
TC Practical; Experimental
CY United States
LA English

```
AB   A nonlithographic technique that utilizes highly ordered anodized
     aluminum oxide porous membrane as template is presented as a general
     fabrication means for the formation of an array of vastly different
     two-dimensional lateral superlattices structures. Hexagonal close-packed
     nanopore arrays were fabricated on Si, GaAs, and GaN
     substrates via reactive ion etching. Quantum dot arrays of various metals
     and semiconductors were formed through evaporation and subsequent etching.
     The two-dimensional lateral superlattice structures fabricated using this
     method are of a high level of ordering, uniformity, and packing density.
     The diameter and periodicity of the nanostructures are determined by the
     features of the original alumina membrane, which can be adjusted by
     varying the anodization conditions.
CC   B2550N Nanometre-scale semiconductor fabrication technology; B2530C
     Semiconductor superlattices, quantum wells and related structures; B2550E
     Surface treatment (semiconductor technology)
CT   ANODISATION; MEMBRANES; NANOTECHNOLOGY; POROUS MATERIALS;
     SEMICONDUCTOR QUANTUM DOTS; SPUTTER ETCHING
ST   two-dimensional lateral superlattices; nanostructures; nonlithographic
     formation; anodic membrane template; highly ordered
     anodized aluminum oxide porous membrane; hexagonal close-packed
     nanopore arrays; reactive ion etching; metal quantum dot
     arrays; semiconductor quantum dot arrays; evaporation; packing
     density; nanostructure periodicity; nanostructure
     diameter; anodization conditions; Si; GaAs; GaN;
     Al2O3
CHI  Si sur, Si el; GaAs sur, As sur, Ga sur, GaAs bin, As bin, Ga bin; GaN
     sur, Ga sur, N sur, GaN bin, Ga bin, N bin; Al2O3 bin, Al2 bin, Al bin, O3
     bin, O bin
ET   Si; As*Ga; As sy 2; sy 2; Ga sy 2; GaAs; Ga cp; cp; As cp; Ga*N; GaN; N
     cp; Al*O; Al2O3; Al cp; O cp; As; Ga; N; Al2O; Al; O


=> d his

     (FILE 'HOME' ENTERED AT 16:00:33 ON 27 JAN 2005)

     FILE 'INSPEC' ENTERED AT 16:00:46 ON 27 JAN 2005
L1             12 METAL AND ANODI######### AND GAN
L2          23740 MASK
L3              0 L1 AND L2
L4          88862 NANO#########
L5              3 L1 AND L4

=> file ca
COST IN U.S. DOLLARS                                  SINCE FILE       TOTAL
                                                           ENTRY     SESSION
FULL ESTIMATED COST                                        17.92       18.13

FILE 'CA' ENTERED AT 16:05:42 ON 27 JAN 2005
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.
PLEASE SEE "HELP USAGETERMS" FOR DETAILS.
COPYRIGHT (C) 2005 AMERICAN CHEMICAL SOCIETY (ACS)
```

FILE COVERS 1907 - 20 Jan 2005 VOL 142 ISS 5
FILE LAST UPDATED: 20 Jan 2005 (20050120/ED)

This file contains CAS Registry Numbers for easy and accurate substance identification.

```
=> l5
      1494008 METAL
       100614 ANODI########
        21523 GAN
       226481 NANO#########
L6          1 L1 AND L4

=> d l4 1 all
YOU HAVE REQUESTED DATA FROM FILE 'INSPEC' - CONTINUE? (Y)/N:n


=> d l6 1 all
```

L6 ANSWER 1 OF 1 CA COPYRIGHT 2005 ACS on STN
AN 140:366181 CA
ED Entered STN: 20 May 2004
TI Structure of assemblies of **metal nanowires** in mesoporous alumina membranes studied by EXAFS, XANES, x-ray diffraction, and SAXS
AU Benfield, Robert E.; Grandjean, Didier; Dore, John C.; Esfahanian, Hamid; Wu, Zhonghua; Kroell, Michael; Geerkens, Marcus; Schmid, Guenter
CS Functional Materials Group, School of Physical Sciences, University of Kent, Canterbury, CT2 7NR, UK
SO Faraday Discussions (2003), Volume Date 2004, 125, 327-342
CODEN: FDISE6; ISSN: 1359-6640
PB Royal Society of Chemistry
DT Journal
LA English
CC 76-2 (Electric Phenomena)
AB Mesoporous alumina membranes ("**anodic** aluminum oxide", or "AAO") are made by **anodic** oxidation of aluminum **metal**. These membranes contain hexagonal arrays of parallel non-intersecting cylindrical pores perpendicular to the membrane surface. By varying the **anodization** voltage, the pore diams. are controllable within the range 5-250 nm. The authors have used AAO membranes as templates for the electrochem. deposition of metals within the pores to produce **nanowires**. These represent assemblies of one-dimensional quantum wires with prospective applications in electronic, optoelectronic, and magnetic devices. Detailed characterization of the structures of these **nanowire** assemblies on a variety of length scales is essential to understand their phys. properties and evaluate their possible applications. The authors have used EXAFS, XANES, WAXS, high energy x-ray diffraction, and SAXS to study their structure and bonding. In this paper, the authors report the results of their studies of four different **nanowire** systems supported in AAO membranes. These are the ferromagnetic metals iron and cobalt, the superconducting **metal** tin, and the semiconductor gallium nitride. Iron **nanowires** in pores of diameter over the range 12 nm-72 nm are structurally very similar to body centered cubic bulk iron. They have a strong preferred orientation within the alumina pores. Their XANES shows significant differences from that of bulk iron, showing that the electronic structure of the iron **nanowires** depends systematically on their diameter Cobalt **nanowires** are composed of a mixture of hcp. and face centered cubic phases, but the ratio of the two phases does not depend in a simple way on the pore diameter or preparation conditions. In bulk cobalt, the face centered cubic β-phase is normally

stable only at high temps. Strong preferred orientation of the c-axis in the pores was found. Tin **nanowires** in alumina membranes with pore diams. between 12 nm and 72 nm have a tetragonal β-structure at ambient temperature and also at 80 K. Magnetic susceptibility measurements show
that they are diamagnetic, and become superconducting at the same temperature as
bulk tin (3.7 K). Gallium nitride **nanowires** have been prepared in alumina membranes with pore diameter 24 nm by a novel method. Gallium nitrate was deposited in the pores from aqueous solution and thermolyzed at 1000° to form Ga2O3, which was reacted with ammonia at 1000°. The **GaN nanowires** have the wurtzite structure. Preparation at 1150° led to the incorporation of aluminum in the **GaN**. The mesoscopic ordering of the pores in the AAO membranes and their filling by **metal nanowires** has been studied by SAXS, which shows patterns of Bragg peaks arising from the pore arrays. Addnl., the cobalt **nanowires** have been the subject of an initial ASAXS study.

ST structure assembly **metal nanowire** mesoporous alumina membrane

IT Porous materials
(mesoporous; structure of assemblies of **metal nanowires** in mesoporous alumina membranes studied by EXAFS, XANES, x-ray diffraction, and SAXS)

IT Membranes, nonbiological
Nanowires
(structure of assemblies of **metal nanowires** in mesoporous alumina membranes studied by EXAFS, XANES, x-ray diffraction, and SAXS)

IT 1344-28-1, Aluminum oxide (Al2O3), uses
RL: NUU (Other use, unclassified); USES (Uses)
(structure of assemblies of **metal nanowires** in mesoporous alumina membranes studied by EXAFS, XANES, x-ray diffraction, and SAXS)

IT 7439-89-6, Iron, uses 7440-31-5, Tin, uses 7440-48-4, Cobalt, uses 25617-97-4, Gallium mononitride
RL: TEM (Technical or engineered material use); USES (Uses)
(structure of assemblies of **metal nanowires** in mesoporous alumina membranes studied by EXAFS, XANES, x-ray diffraction, and SAXS)

RE.CNT 72 THERE ARE 72 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) AlMawlawi, D; J Appl Phys 1991, V70, P4421 CA
(2) Anon; Small Angle X-ray Scattering 1982
(3) Anon; X-Ray Absorption: Principles, Applications, Techniques of EXAFS, SEXAFS and XANES 1988
(4) Anon; http://srs.dl.ac.uk/XRS/Stations/Descriptions/stat7_1.html
(5) Anon; http://srs.dl.ac.uk/XRS/Stations/Descriptions/stat9_2.html
(6) Anon; http://www.clupos.lth.se
(7) Anon; http://www.esrf.fr/exp_facilities/BM29/
(8) Anon; http://www.esrf.fr/exp_facilities/ID1/user_guide/
(9) Anon; www.esrf.fr/exp_facilities/ID15B/home/id15home.html
(10) Bantu, A; J Appl Phys 2001, V89, P3393 CA
(11) Bazin, D; J Phys Chem 1997, V101, P11040 CA
(12) Benedetti, A; Catal Today 1999, V49, P485 CA
(13) Benfield, R; Eur Phys J D 2001, V16, P399 CA
(14) Benfield, R; J Phys Chem B 2001, V105, P1961 CA
(15) Benfield, R; submitted for publication
(16) Binsted, N; EXAFS Analysis Programs 1991
(17) Cheng, G; Appl Phys Lett 1999, V75, P2455 CA
(18) Creighton, J; J Chem Soc, Faraday Trans 1991, V87, P3881 CA
(19) Diggle, J; Chem Rev 1969, V69, P365 CA
(20) Dore, J; Stud Surf Sci Catal 2002, V144, P163 CA
(21) Encinas, A; IEEE Trans Magn 2002, V38, P2574 CA

(22) Fasol, G; Science 1996, V272, P1751 CAPLUS
(23) Fert, A; J Magn Magn Mater 1999, V200, P338 CA
(24) Fletcher, D; J Chem Inf Comput Sci 1996, V36, P746 CA
(25) Foss, C; J Phys Chem 1994, V98, P2963 CA
(26) Gao, T; Chin Phys 2002, V11, P1307 CA
(27) Ge, S; J Appl Phys 2001, V90, P509 CA
(28) Geerkens, M; PhD thesis, University of Essen 2002
(29) Greenwood, N; Chemistry of the Elements 1984, P1292
(30) Greenwood, N; Chemistry of the Elements 1984, P4334
(31) Hammersley, A; FIT2D: An Introduction and Overview 1997, ESRF Internal Report ESRF97HA02T
(32) Hanaoka, T; Appl Organomet Chem 1998, V12, P367 CA
(33) Hanaoka, T; Eur J Inorg Chem 1998, P807 CA
(34) Hornyak, G; Chem Eur J 1997, V3, P1951 CA
(35) Hua, D; Stud Surf Sci Catal 1994, V87, P255 CA
(36) Huber, C; Science 1994, V263, P800 CA
(37) Hulteen, J; J Mater Chem 1997, V7, P1075 CA
(38) Katsikini, M; J Synchrotron Radiat 1999, V6, P561 CA
(39) Keller, F; J Electrochem Soc 1953, V100, P411 CA
(40) Kraus, W; PowderCell 2.3, http://www.bam.de/service/publikationen/powdercell_i.htm 2002
(41) Kroll, M; J Magn Magn Mater 2002, V249, P241 CA
(42) Kroll, M; PhD thesis, University of Essen 2000
(43) Kroll, M; in preparation
(44) Kyotani, T; Bull Chem Soc Jpn 1999, V72, P1957 CA
(45) Lee, J; Chem Commun 2002, P138 CA
(46) Lee, K; J Appl Phys 2002, V91, P8513 CA
(47) Li, F; Phys Status Solidi A 2002, V193, P196 CA
(48) Marchal, D; Langmuir 2001, V17, P8313 CA
(49) Martin, B; Adv Mater 1999, V11, P1021 CA
(50) Martin, C; Science 1994, V266, P1961 CA
(51) Metzger, R; IEEE Trans Magn 2000, V36, P30 CA
(52) Neupert, V; SPECPLOT 1998
(53) O'Sullivan, J; Proc R Soc London, Ser A 1970, V317, P511 CA
(54) Pan, S; Appl Phys A 2000, V70, P637 CA
(55) Paulus, P; J Magn Magn Mater 2001, V224, P180 CA
(56) Peng, Y; J Appl Phys 2000, V87, P7405 CA
(57) Ponce, F; Nature 1997, V386, P351 CA
(58) Routkevitch, D; IEEE Trans Electron Devices 1996, V43, P1646 CA
(59) Routkevitch, D; J Phys Chem 1996, V100, P14037 CA
(60) Sawitowski, T; PhD thesis, University of Essen 1999
(61) Scarani, V; J Magn Magn Mater 1999, V205, P241 CA
(62) Schmid, G; J Mater Chem 2002, V12, P1231 CA
(63) Sellmyer, D; J Phys Condens Matt 2001, V13, PR433 CA
(64) Sorop, T; Phys Rev B 2003, V67, P014402
(65) Strijkers, G; J Appl Phys 1999, V86, P5141 CA
(66) Sun, M; Appl Phys Lett 2001, V78, P2964 CA
(67) Tyson, C; Phys Rev B 1992, V45, P8924 CA
(68) Wang, C; Chin Sci Bull 2000, V45, P1373 CA
(69) Whatman International Limited; Anopore membranes
(70) Whatman International Limited; Cyclopore and Nuclepore membranes
(71) Zhang, J; Chem Phys Lett 2001, V345, P372 CA
(72) Zhang, Q; J Mater Sci Lett 2001, V20, P925 CA

```
=> d his

     (FILE 'HOME' ENTERED AT 16:00:33 ON 27 JAN 2005)

     FILE 'INSPEC' ENTERED AT 16:00:46 ON 27 JAN 2005
L1             12 METAL AND ANODI######## AND GAN
L2          23740 MASK
L3              0 L1 AND L2
L4          88862 NANO#########
```

```
L5            3 L1 AND L4

     FILE 'CA' ENTERED AT 16:05:42 ON 27 JAN 2005
L6            1 L5

=>
```

WEST Search History

Hide Items | Restore | Clear | Cancel

DATE: Thursday, January 27, 2005

Hide?	Set Name	Query	Hit Count
	DB=USPT; PLUR=YES; OP=OR		
☐	L30	5306661.pn.	1
☐	L29	5581091.pn.	1
☐	L28	5581091.pn.	1
☐	L27	5581091.pn.	1
☐	L26	5880525.pn.	1
☐	L25	5880525.pn.	1
☐	L24	6034468.pn.	1
☐	L23	6034468.pn.	1
☐	L22	6044981.pn.	1
☐	L21	6044981.pn.	1
☐	L20	6177291.pn.	1
☐	L19	6177291.pn.	1
☐	L18	6231744.pn.	1
☐	L17	6231744.pn.	1
☐	L16	6359288.pn.	1
	DB=PGPB,USPT,EPAB,JPAB,DWPI,TDBD; PLUR=YES; OP=OR		
☐	L15	20030010971	2
☐	L14	L13 and l1	6
☐	L13	L12 same l11	1026
☐	L12	porous	415027
☐	L11	metal near10 anodi$5	13224
☐	L10	l6 and l4	32
☐	L9	L8 not l7	11
☐	L8	l4 and l6	32
☐	L7	L6 and l5	21
☐	L6	anodi$5	69905
☐	L5	20030202	215
☐	L4	l1 same l3	300
☐	L3	nano$5	86194
☐	L2	nano$5	86194
☐	L1	(gallium adj nitride)or gan	21854

FIELD EMISSION CHARACTERISATION OF SILICON TIP ARRAYS COATED WITH GAN AND DIAMOND NANOPARTICLE CLUSTER

M.Hajra[1], N.N.Chubun[1], A.G.Chakhovskoi[1], C.E.Hunt[1], K.Liu[1], A.Murali[2], S H. Risbud [2]
T.Tyler[3] and V.Zhirnov[3]

[1]Electrical and Computer Engineering Department University of California, Davis, CA
[2]Chemical Engineering and Materials Science Department University of California, Davis, CA
[3]Materials Science and Engineering Department, North Carolina State University, Raleigh, NC

ABSTRACT

Wide band gap materials show promise for applications in coating of field emission tips. Recently nanocrystalline hexagonal GaN crystallites as small as 5 nm average diameter have been formed using reactive laser ablation of gallium metal in a nitrogenating ambient. In this paper we have investigated the performance of ungated emitter.

Silicon tip arrays coated by dielectrophoresis of gallium nitride nanoparticles or nanocrystalline diamond clusters from an ethanol suspension. The emitters were evaluated and compared before and after the surface treatment using SEM images and I-V measurements in the diode configuration. The phosphor screen, used as the anode was spaced nominally 70 μm from the cathode. A field emission characteristics were measured in a high-vacuum chamber at a pressure range between 10^{-5} and 10^{-8} Torr. The results suggest that the emitters benefit from coating the surface with nanocrystalline diamond clusters in terms of reduction in the turn on voltage and increase in the uniformity of emission in low voltage operation. The long-term emission stability was studied over a period of 90 hrs.

INTRODUCTION

The presence of adsorbed species on the surface of the field-emitter tip can remarkably influence the behavior of electron emission based devices. The presence of the surface contaminants leads to unstable cathode operation. The desirable cathode surface is one that is chemically inert and has a low workfunction. Hence potentially chemically inert emitter-tip overcoatings with wide band gap materials are preferred for a field emission system.

The GaN or diamond nanoparticle cluster is deposited on the surface of the silicon emitters using dielectrophoresis technique. The device configuration considered for the surface treatment of the emitters is the "bed of nails" which is an array of un-gated single-crystal Si emitters placed in an area of 4 cm^2 with a tip-to-tip spacing of 6μm. The emitters were formed from p-type (1-10Ωcm) Si (100) substrates by the subtractive tip fabrication process.

In this work, first results on emission from silicon emitters coated with nano GaN particle clusters are reported. We studied the field emission characteristics and emission stability before and after the emitter surface is coated with GaN nanoparticles or nanocrystalline diamond clusters over an operating cycle of 90 hrs.

0-7803-7197-6/01/$10.00

RESULTS AND DISCUSSION

We tested the emission properties of the cathodes in a diode configuration. The packaging of the cathodes containing the array of ungated Si-tips for testing in a high vacuum environment is done by placing quartz spacers, 60 – 70 μm thick between the cathode and the phosphor screen, which acts as an anode.

Both the coated cathodes show an improvement in the long-term stability fluctuation as seen from the Fig 1. Cathodes coated with GaN nanoparticles clusters show significant improvement in the current. With the cathodes coated with GaN nanoparticle cluster, the current is more stable when compared with cathodes coated with diamond nanoparticle cluster. The improvement in the current stability is mainly due to the chemically inert intrinsic behavior of diamond and gallium nitride. It acts as a protective layer for the tip from ion bombardment.

CONCLUSION

In this paper we have studied the behavior of the cathodes coated with GaN nanoparticle and nanocrystalline diamond cluster over an operating cycle of 90 hrs. A comparative study show that emitters coated with GaN nanoparticle cluster show significant improvement in the current fluctuation. Both the coated cathodes show a stable operation during the course of this experiment. Further analysis of the current stability from both these cathodes are being studied

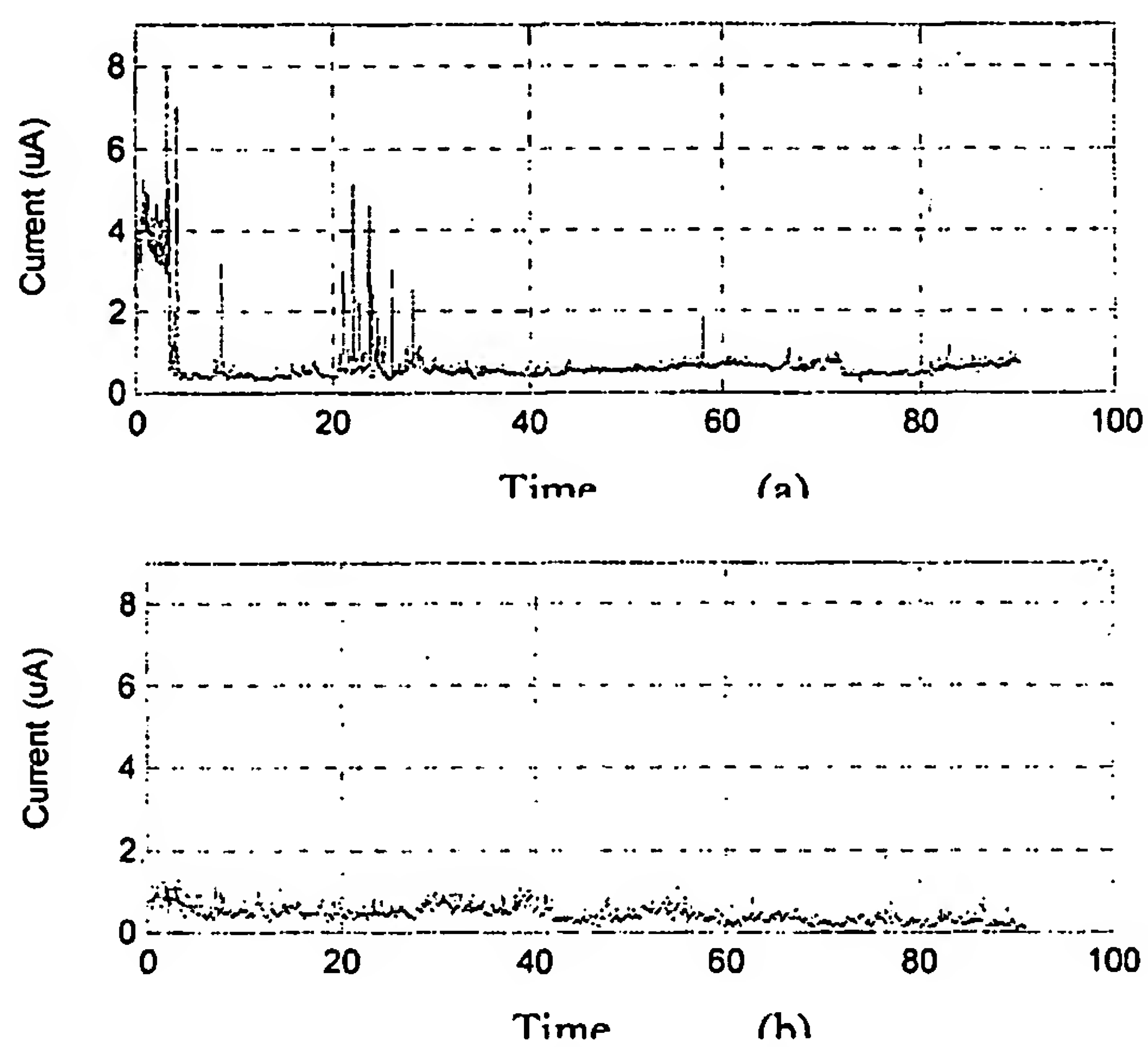

Fig.1 I- characteristics observed over an operating period of 90 hrs for the cathode treated with (a) GaN nanoparticle clusters (b) with nanocrystalline diamond clusters